PATENT ABSTRACTS OF JAPAN

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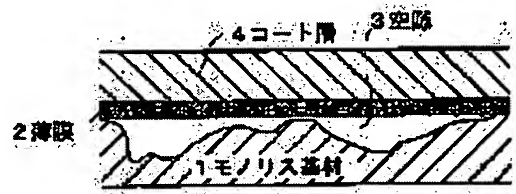
(54) EXHAUST GAS CLEANING CATALYST

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an exhaust gas cleaning catalyst, wherein a matrix is inhibited from being deteriorated so as to prevent the catalyst from deteriorating in strengths, e.g. thermal shock resistance.
SOLUTION: This catalyst has a thin film 2 comprising a porous oxide between an alkali-metal-carrying coat layer 4 and a matrix 1. The catalyst can be prevented from being deteriorated in strengths because the ability of the film 2 to inhibit the alkali metal from reacting with the base prevents the matrix from changing in composition.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the catalyst for emission gas purification which improved reinforcement, such as thermal shock resistance, in detail about the catalyst for emission gas purification used for an exhaust air system etc. from an automobile engine.
[0002]
[Description of the Prior Art] In recent years, the global warming by the carbon dioxide poses a problem, and it has been a technical problem to reduce the discharge of a carbon dioxide. Also in an automobile, reduction of the amount of carbon dioxides in exhaust gas serves as a technical problem, and the lean burn engine to which lean combustion of the fuel is carried out in a hyperoxia ambient atmosphere is developed. According to this lean burn engine, the discharge of a carbon dioxide can be controlled by improvement in fuel consumption.
[0003] It is NOx, making it always burn on the fuel Lean conditions of hyperoxia in this lean burn engine, and using exhaust gas as reducing atmosphere by considering as fuel SUTOIKI - rich conditions intermittently. The system which carries out reduction purification is developed and put in practical use. And as the optimal catalyst for this system, it is NOx at fuel lean atmosphere. NOx by which occlusion was carried out by carrying out occlusion NOx emitted in a fuel SUTOIKI - rich ambient atmosphere NOx using occlusion material The catalyst for emission gas purification of an occlusion reduction type is developed.
[0004] For example, the catalyst for emission gas purification which supported alkaline earth metal and Pt(s), such as Ba, to porosity oxide support, such as gamma-aluminum 2O3, is proposed by JP,5-317652,A. Moreover, publication number The catalyst for emission gas purification which supported alkali metal and Pt(s), such as K, to porosity oxide support, such as gamma-aluminum 2O3, is proposed by 6 No. -31139 official report. Furthermore, the catalyst for emission gas purification which supported rare earth elements and Pt(s), such as La, to porosity oxide support, such as gamma-aluminum 2O3, is proposed by JP,5-168860,A.
[0005] This NOx If an occlusion reduction type catalyst is used, exhaust gas will also consist pulse-like of lean atmosphere with a SUTOIKI - rich ambient atmosphere by controlling an air-fuel ratio to consist pulse-like of a fuel Lean side a fuel SUTOIKI - rich side. Therefore, at the Lean side, NOx is NOx. It is NOx even if it is exhaust gas from a lean burn engine, since it reacts with reducibility components which occlusion is carried out to occlusion material, and it is emitted by the SUTOIKI - rich side, and are contained so much in exhaust gas, such as a hydrocarbon (HC) and a carbon monoxide (CO), and is purified. It can purify efficiently. Moreover, HC and CO in exhaust gas are NOx while oxidizing with noble metals. Since it is consumed by reduction, HC and CO are also purified efficiently.
[0006]
[Problem(s) to be Solved by the Invention] By the way, with the catalyst for emission gas purification for automobiles, while stabilizing and holding in the emission way of an automobile and raising the touch area of exhaust gas and a catalyst component, it is necessary to control increase of a pressure loss

as much as possible. Then, from the former, it is cordierite etc. The base material of the honeycomb configuration formed from MgO, aluminum2O3, and SiO2 multiple oxide is used, and many monolithic catalysts in which the coat layer which consists of porosity support which supported the catalyst component was formed on the front face of this base material are used.
[0007] However, NOx It sets to the monolithic catalyst of an occlusion reduction type, and is NOx. In the thing using alkali metal as occlusion material, degradation of a base material arose while in use, and it became clear that reinforcement, such as thermal shock resistance, falls compared with other catalysts, such as a three way component catalyst. Therefore, it is necessary to raise the frequency of exchange and there is fault that the cost per unit time is high.
[0008] This invention is made in view of such a situation, and it aims at preventing the fall of reinforcement, such as thermal shock resistance, by controlling degradation of a base material.
[0009]
[Means for Solving the Problem] the thin film which the description of the catalyst for emission gas purification of this invention which solves the above-mentioned technical problem is formed in the front face of a base material and a base material, and consists of an oxide, and the coat layer which consists of porosity support which was formed in the front face of a thin film and supported noble metals and alkali metal at least -- since -- it is in becoming.
[0010] Thickness of a thin film It is desirable that it is 100 micrometers or less, and, as for a thin film, it is desirable to form precipitate of a metal hydroxide in a base material front face according to an acid-alkaline reaction, and to calcinate and form it.
[0011] moreover, the coat layer which consists of porosity support which the description of the catalyst for emission gas purification of another this invention which solves the above-mentioned technical problem was formed in the front face of a base material and a base material, and supported noble metals and alkali metal at least -- since -- it is the becoming catalyst for emission gas purification, and is in the die length which the base material and the coat layer touch per unit length of a coat layer having come out comparatively, and having made a certain contact rate into 30 - 85%.
[0012]
[Embodiment of the Invention] Invention-in-this-application persons inquired wholeheartedly about the cause of degradation of a base material. For example NOx which used as the base material the structures, such as cordierite which consists of MgO, aluminum2O3, and SiO2 multiple oxide, and supported noble metals and alkali metal With the catalyst for emission gas purification of an occlusion reduction type, it became clear that a coefficient of thermal expansion becomes high compared with what does not contain alkali metal. If a coefficient of thermal expansion becomes high, thermal shock resistance will fall and reinforcement will fall.
[0013] And when support distribution of the alkali metal in the catalyst which the above-mentioned fault produced was investigated, alkali metal existed also in the base material. Therefore, it was solved that it is in the reaction of a base material component (especially SiO2) and alkali metal arising from the interface of a coat layer and a base material preferentially as a cause of the above-mentioned fault, and the multiple oxide presentation of a base material changing.
[0014] So, in this invention, it is considering as the configuration between which it was placed between the base material and the coat layer by the thin film which consists of an oxide. By having considered as such a configuration, it is avoided that the alkali metal and the base material in a coat layer contact directly, and it can control the reaction of alkali metal and a base material component. Therefore, it is controlled that a base material presentation changes and it can prevent a strong fall.
[0015] Moreover, with another catalyst for emission gas purification of this invention, the die length which the base material and the coat layer touch per unit length of a coat layer comes out comparatively, and a certain contact rate is made into 30 - 85%. The reaction of the alkali metal in a coat layer and a base material component occurs from the contact interface of a coat layer and a base material preferentially. Therefore, since the contact interface of a coat layer and a base material is reduced by having constituted in this way, the probability for the alkali metal and the base material in a coat layer to contact directly becomes low, and can control the reaction of alkali metal and a base material

component.
[0016] As a base material, it is cordierite etc. Although MgO, aluminum2O3 and SiO2 system multiple oxide, TiO2-aluminum2O3 system multiple oxide, and Si3N4 etc. was illustrated, it excelled especially in thermal resistance. MgO-aluminum2O3 and a SiO2 system multiple oxide are desirable. The configuration of this base material will not be restricted especially if a touch area with exhaust gas, such as porosity configurations, such as a honeycomb configuration and foam, reticulated, and a pellet type, is big.

CLAIMS

[Claim(s)]
[Claim 1] a base material, the thin film which is formed in the front face of this base material, and consists of an oxide, and the coat layer which consists of porosity support which was formed in the front face of this thin film, and supported noble metals and alkali metal at least -- since -- the catalyst for emission gas purification characterized by becoming.
[Claim 2] Thickness of said thin film Catalyst for emission gas purification according to claim 1 characterized by being 100 micrometers or less.
[Claim 3] Said thin film is a catalyst for emission gas purification according to claim 1 characterized by having formed precipitate of a metal hydroxide in said base material front face according to the acid-alkaline reaction, having calcinated it and being formed.
[Claim 4] a base material and the coat layer which consists of porosity support which was formed in the front face of this base material, and supported noble metals and alkali metal at least -- since -- the catalyst for emission gas purification which is a becoming catalyst for emission gas purification, and is characterized by for the die length which this base material and this coat layer touch per unit length of this coat layer having come out comparatively, and making a certain contact rate into 30 - 85%.

[Translation done.]

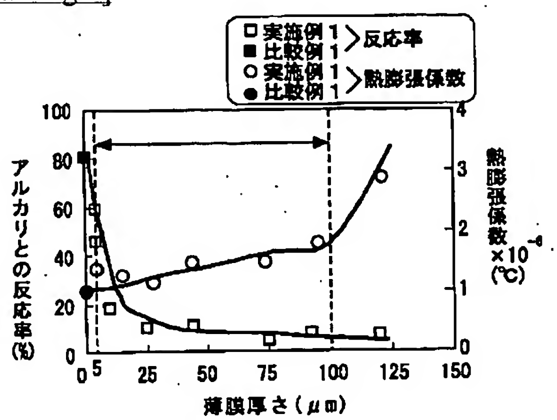
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the graph which shows the relation between the thickness of a thin film, and the conversion of a potassium and a base material presentation and a coefficient of thermal expansion.
[Drawing 2] It is the graph which shows the relation between the burning temperature of a thin film, and a potassium and the conversion of a base material presentation.
[Drawing 3] It is the graph which shows the relation between the particle size of the raw material oxide of a thin film, and a potassium and the conversion of a base material presentation.
[Drawing 4] It is the graph which shows the potassium of a catalyst with the thin film formed from various oxides, and the conversion of a base material presentation.
[Drawing 5] It is the graph which shows the relation between the thickness of the thin film formed by the acid-alkaline reaction, and a potassium and the conversion of a base material presentation.
[Drawing 6] It is the expanded sectional view showing the catalyst of an example 1 typically.
[Drawing 7] It is the expanded sectional view showing the catalyst of examples 5 and 6 typically.
[Drawing 8] It is the graph which shows the relation between a coat layer, the contact rate of a base material, and the conversion of a potassium and a base material presentation and reinforcement.
[Drawing 9] It is the typical sectional view of the monolith base material used in the example 8.
[Drawing 10] It is the typical sectional view of the monolith base material used in the example 9.
[Drawing 11] It is the graph which shows the relation between a coat layer, the contact rate of a base material, and the conversion of a potassium and a base material presentation and reinforcement.

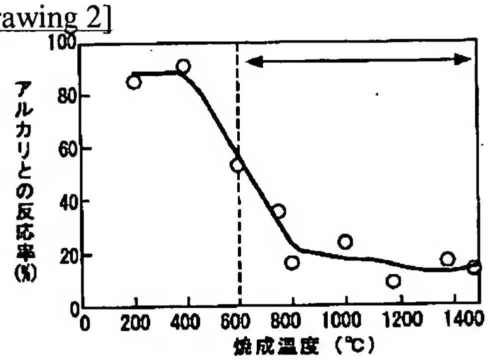
[Translation done.]

DRAWINGS

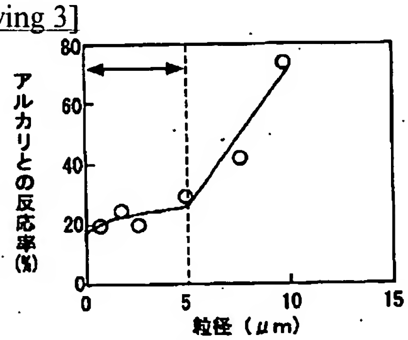
[Drawing 1]



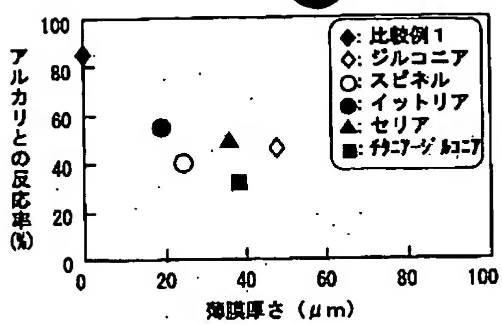
[Drawing 2]



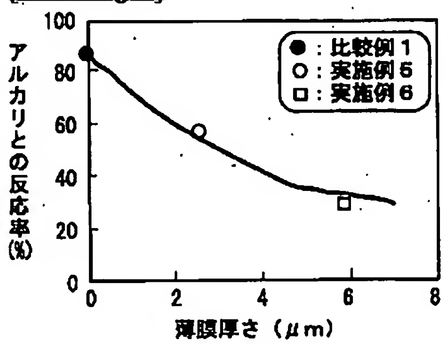
[Drawing 3]



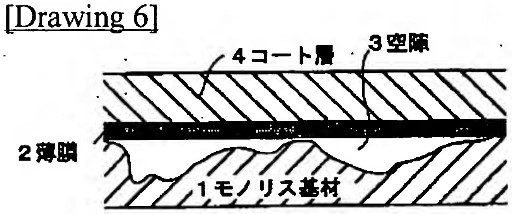
[Drawing 4]



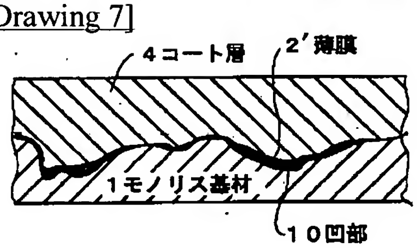
[Drawing 5]



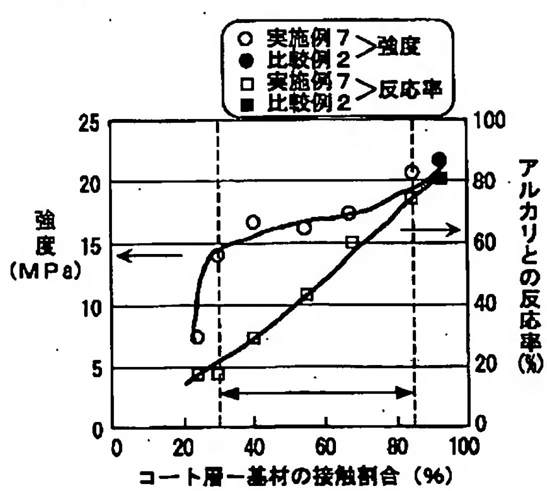
[Drawing 6]



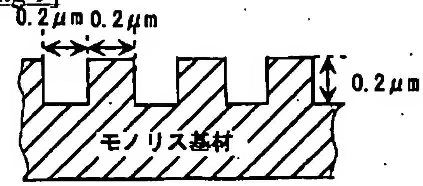
[Drawing 7]



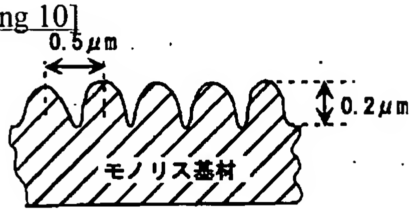
[Drawing 8]



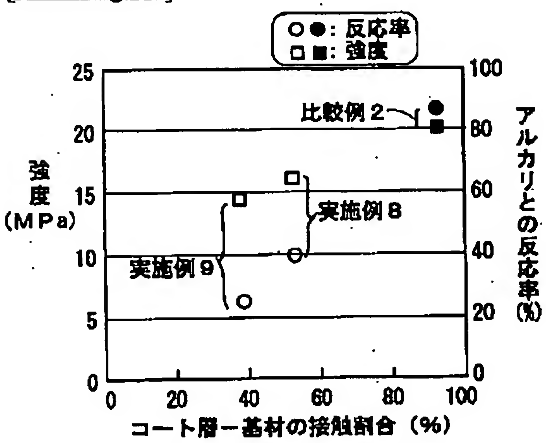
[Drawing 9]



[Drawing 10]



[Drawing 11]



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